

Blanchard River Watershed Study

December 10-12, 2012

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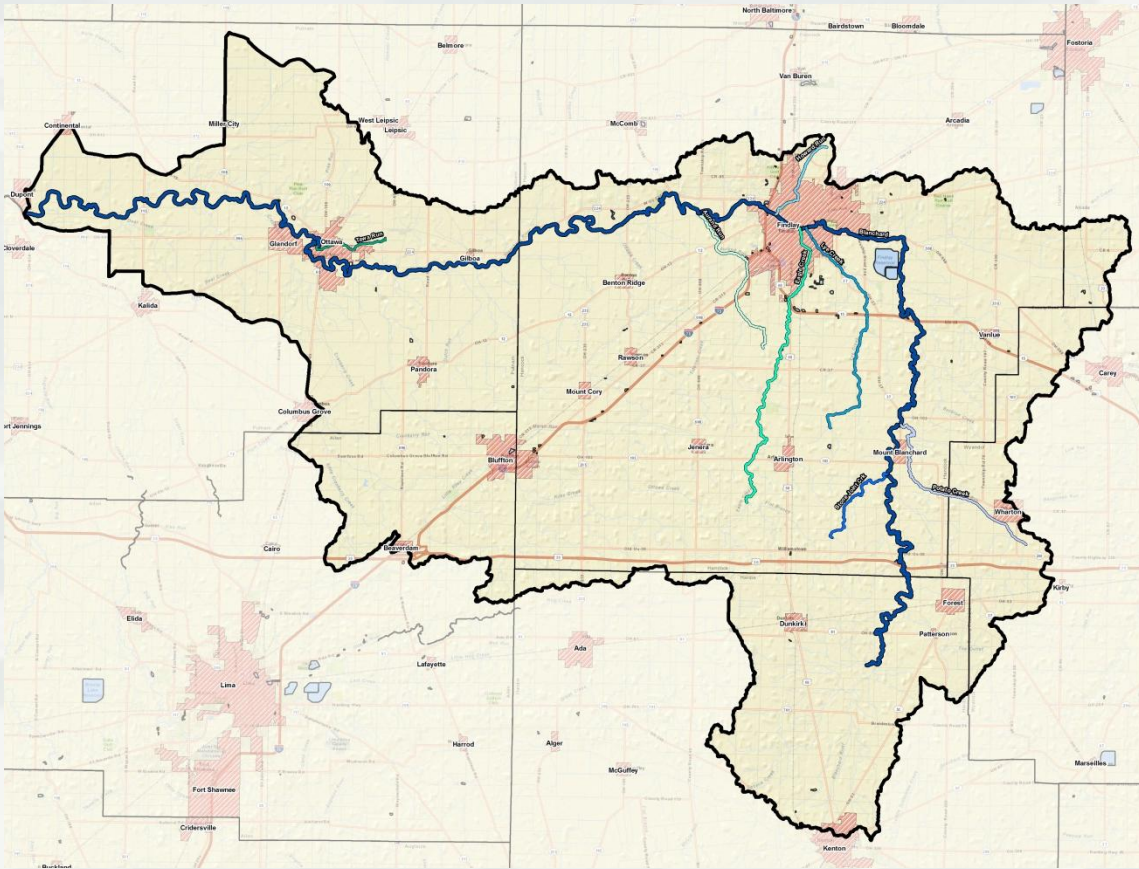
US Army Corps of Engineers
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Blanchard River Watershed Feasibility Study

Findlay/Ottawa Meetings

December 10 and 11, 2012



- 771 Square Miles
- Flows into Auglaize, then Maumee River.
- Mostly Agricultural Land Use
- Very Flat Except in Headwater Areas of Watershed
- Larger Communities include City of Findlay, Village of Ottawa, Glandorf, Bluffton.
- Other Major Tributaries Include:
 - ▶ Lye Creek
 - ▶ Eagle Creek
 - ▶ Riley Creek (Bluffton)



Agenda

- Introductions
- Purpose of Project
- Review Authority
- Discuss of Project Measures and Plan Components
- Costs of Various Measures
- Benefits of Various Plan Components
- Process and Schedule Moving Forward
- Address Questions Submitted on Cards



NEPA Scoping

- Purpose
 - ▶ Identify issues and alternatives the public wishes to be considered for the Environmental Impact Statement (EIS)
- Blanchard NEPA Scoping
 - ▶ Two meetings previously held in 2008
 - ▶ These four meetings week of 10 DEC 2012
- Public Comment
 - ▶ 30 day Public Comment period begins 12 DEC
 - ▶ Comments required in this period for consideration for Tentatively Selected Plan
 - ▶ By mail
 - ▶ By email
 - Blanchard.NEPA@usace.army.mil



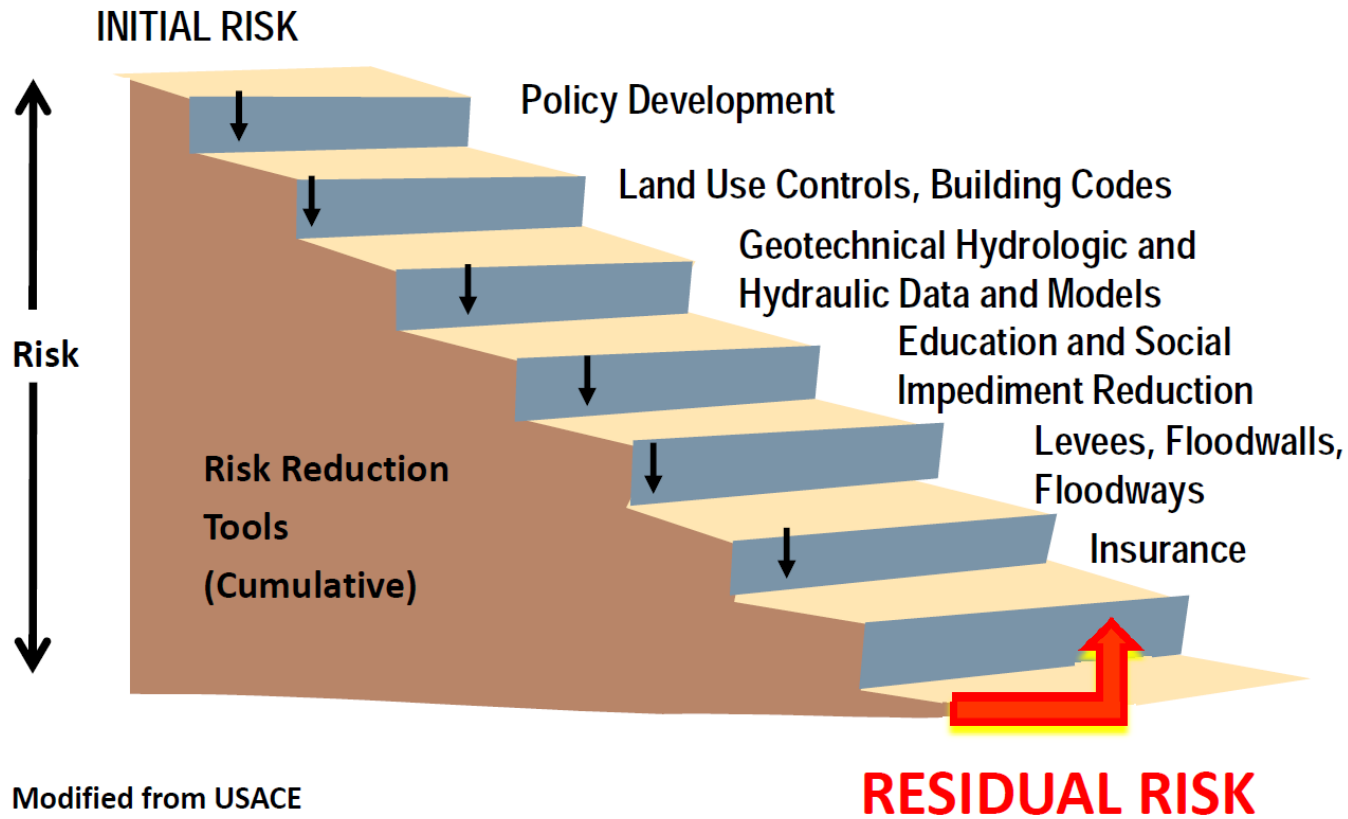
Purpose

- Identify Flood Risk Management Measures in Findlay and Ottawa
- Discuss Features, Benefits, and Costs
- Process and Schedule Moving Forward



Flood Risk Management

Living with Floods –Recognizing and Managing Risk



Authority

- Section 441 – Western Lake Erie Basin, Ohio, Indiana and Michigan – conduct study to develop measures to improve flood control.

- Cost Sharing:
 - ▶ Hancock County Non-Federal Sponsors
 - ▶ Implementation: 50% Federal, 50% non-Federal

- Funding
 - ▶ Currently funded to Spring 2013
 - ▶ Future funding required to complete study



Purpose of Study

- Develop Plan for Flood Risk Reduction
 - ▶ Damage of Structures
 - ▶ Loss of Life
 - ▶ Highest Net Benefits (Benefits of Plan less Cost of Plan)
- Structural Measures
 - ▶ Reduction in Water Surface Elevation and Inundation Area
 - ▶ Will not result in elimination or significant reduction of risk of flooding in Blanchard Watershed
- Non-Structural Measures
 - ▶ Removal or Elevation of structures serve to minimize risk of damages due to flooding
- Design Condition
 - ▶ There is always the risk that an event will be greater than design condition. 1913 > 100 year event
 - ▶ Probability of 100 year event during 30-year mortgage ~ 26%



Feasibility Study Components

Where are we now?

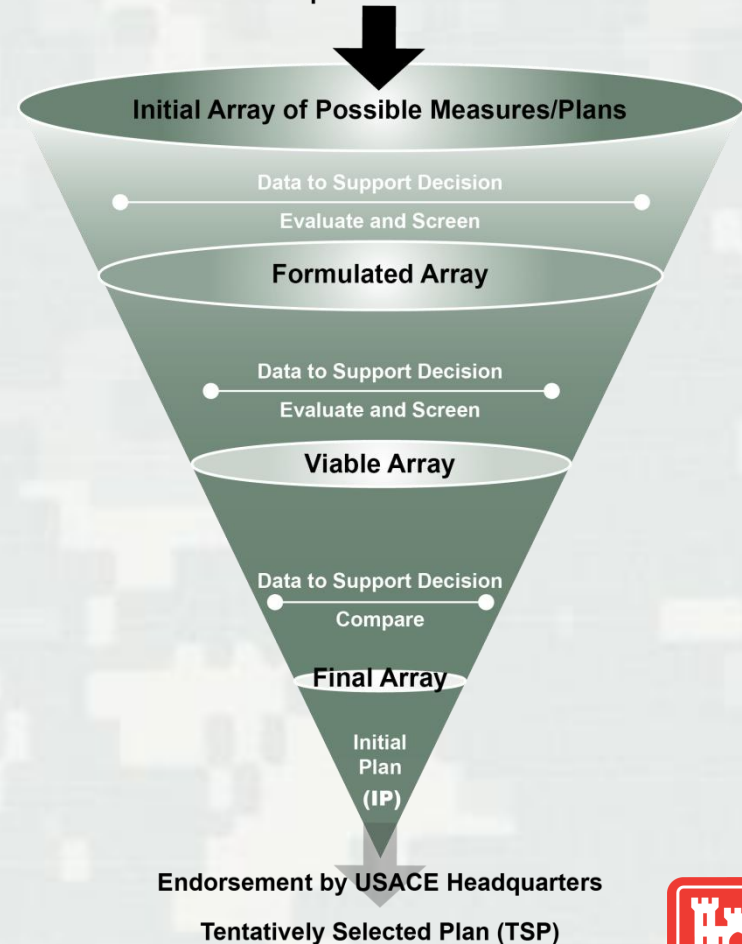
■ Process

- ✓ Determination of Federal Interest Fact Sheet
- ✓ Inventory existing conditions
- ✓ Problem identification
- ✓ Determine planning objective and constraints
- ✓ Develop measures
- ✓ Combine measures to formulate alternative plans
- ✓ Evaluate alternative plans
- ✓ Select a plan

■ Documents

- ✓ Final Array Synopsis and Risk Register
- ✓ Detailed Project Report (DPR)
- ✓ Environmental Assessment or Environmental Impact Statement

Range of Structural and Non-Structural Flood Risk Management Measures/Components to Solve Problems



Flood Risk Management Measures Considered

Category	Measures	Status
Detention Basins	<ul style="list-style-type: none"> - In-line Detention Eagle Cr. - Off-line Detention F/Ottawa - Off-line Detention West. Div. 	<ul style="list-style-type: none"> - Carried Forward - Carried Forward - Eliminated
Flood Plain Evacuation	<ul style="list-style-type: none"> - Comprehensive solution - Selected Evacuation (NS) 	<ul style="list-style-type: none"> - Eliminated - Carried Forward
Channel Improvements	<ul style="list-style-type: none"> - Deepen Widen Blanchard 	<ul style="list-style-type: none"> - Eliminated
High Velocity Channels	<ul style="list-style-type: none"> - Deepen Blanchard 	<ul style="list-style-type: none"> - Eliminated
Levees and Floodwalls	<ul style="list-style-type: none"> - Levee/Floodwalls in Findlay 	<ul style="list-style-type: none"> - Eliminated
Diversions/Channel Relocations	<ul style="list-style-type: none"> - Blanchard to Lye Cutoff - Western Diversion 	<ul style="list-style-type: none"> - Carried Forward - 2 Alignments Carried Forward
Non-Structural Retrofits	<ul style="list-style-type: none"> - Elevate, retrofit, buyout 	<ul style="list-style-type: none"> - Carried Forward
Bridge Removal/Modification	<ul style="list-style-type: none"> - General removal - Norfolk Southern RR Bridge 	<ul style="list-style-type: none"> - Not Carried Forward - Carried Forward
Flood Warning/Emergency Measures	<ul style="list-style-type: none"> - Gauges, Notification System 	<ul style="list-style-type: none"> - Implemented

Feasibility Study Technical Considerations To Identify Recommended Plan

- Build and Test HEC-FDA Unsteady State Hydrology and Hydraulics Model Without Project Measures (Baseline Conditions Model)
- Calibrate Model Against Existing Gage Data Available in the Watershed
- Screen and Identify Measures for Detailed Evaluation Using HEC-RAS Model Determine Flood Reduction Benefits Across A Range of Frequency Storms (5, 10, 25, 50, 100, 200, and 500 year Storms)
- Evaluate Benefits in Terms of:
 - ▶ Flood Elevation Reductions
 - ▶ Net Benefits (Reduced Damages)
 - ▶ Flood Damage Reduction Benefits
 - ▶ Residual Damages (damages that cannot be eliminated)
 - ▶ Environmental and Social Impacts
 - ▶ Emergency Access Improvement/Life Safety

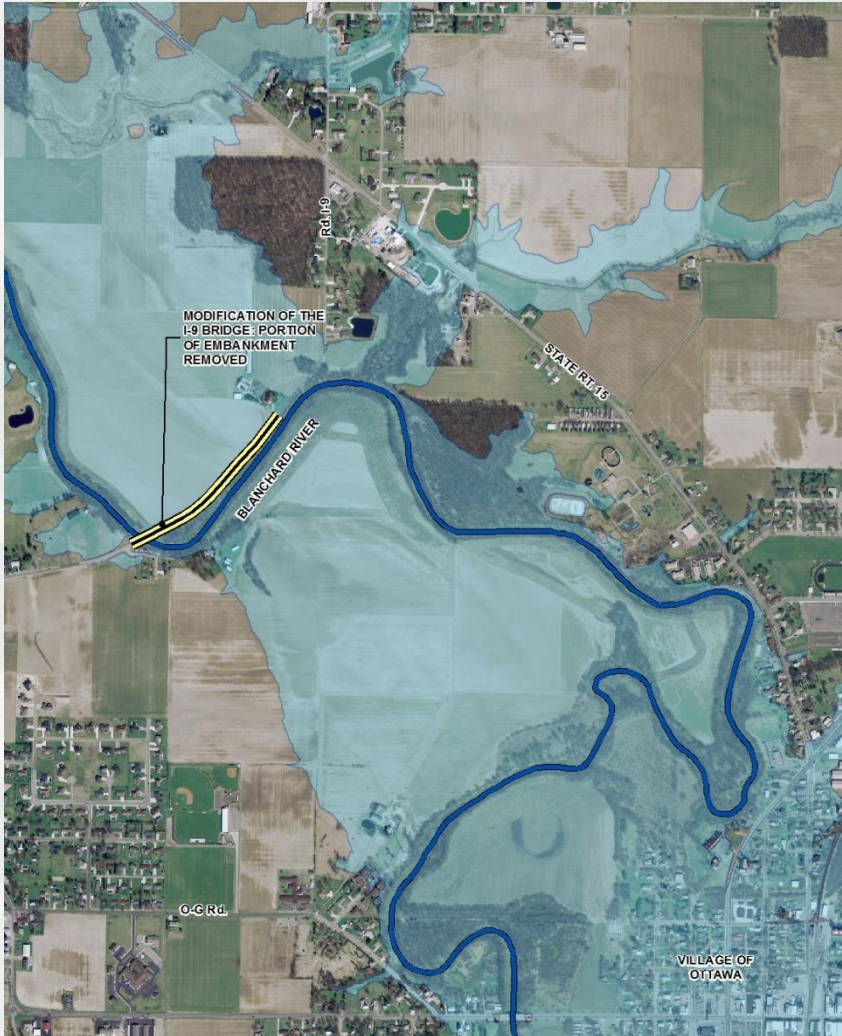


Ottawa Alternative Plans



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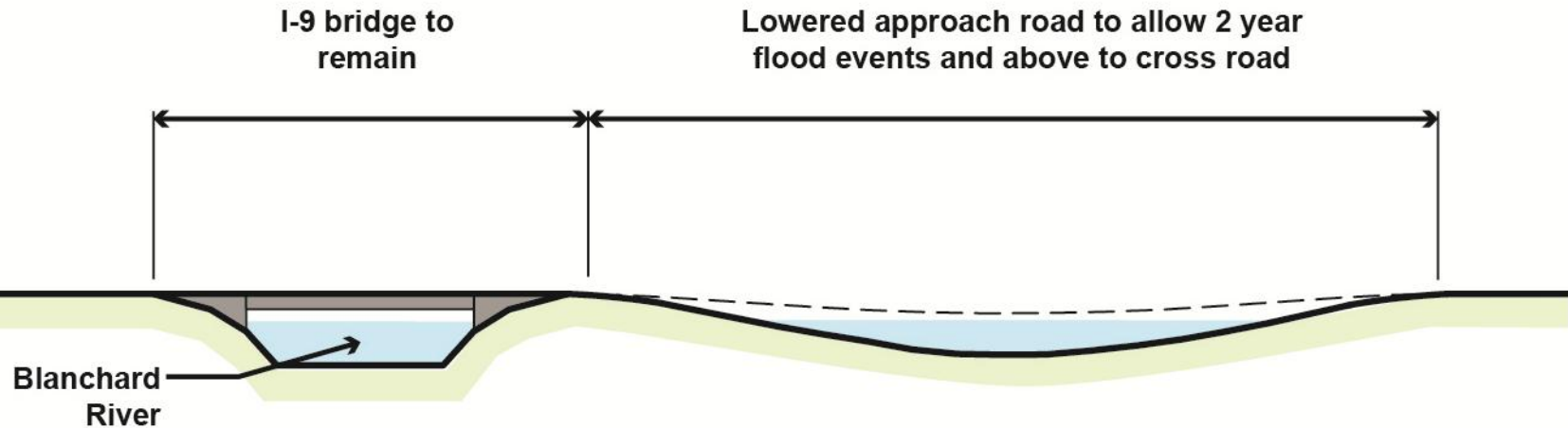
Modification of I – 9 Bridge Approach



- Remove Embankment
- Bridge Stays As Is
- Restore Flow, Reduce Upstream Flood Elevations
- Cost \$1-2M

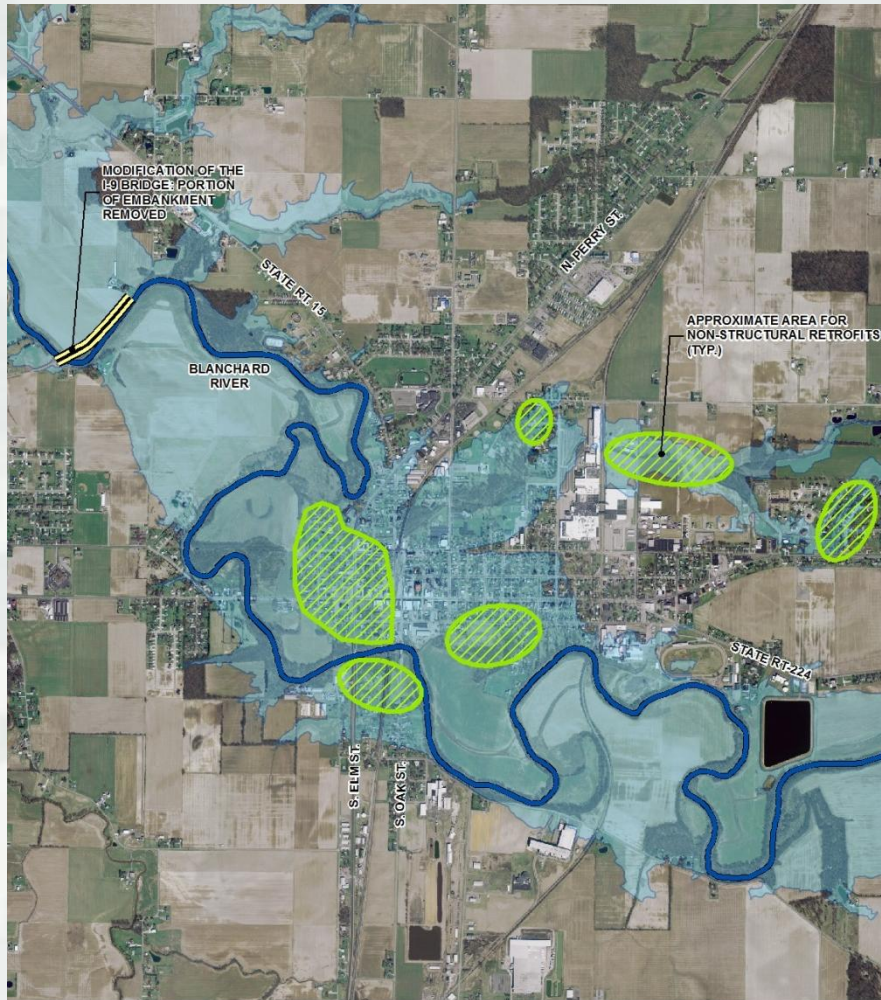


I-9 Bridge and Approach Profile



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I-9 Bridge Modification Plus Non-Structural Measures



- Includes I-9 Bridge Modification
- Non-structural Measures in Ottawa
- Restore Flow, Reduce Upstream Flood Elevations, Prevent/Reduce Damages to Existing Structures
- Cost \$2M to \$80M
- Cost driven by level of floodplain protection (5 to 100 year) for Non-structural Plan



Typical Non-Structural Measures Considered



Building elevation in progress



Building elevation complete



Ringwall protection



*Building acquisition and removal from
floodplain*



Typical Non-Structural Measures Considered

Three nonstructural scales:

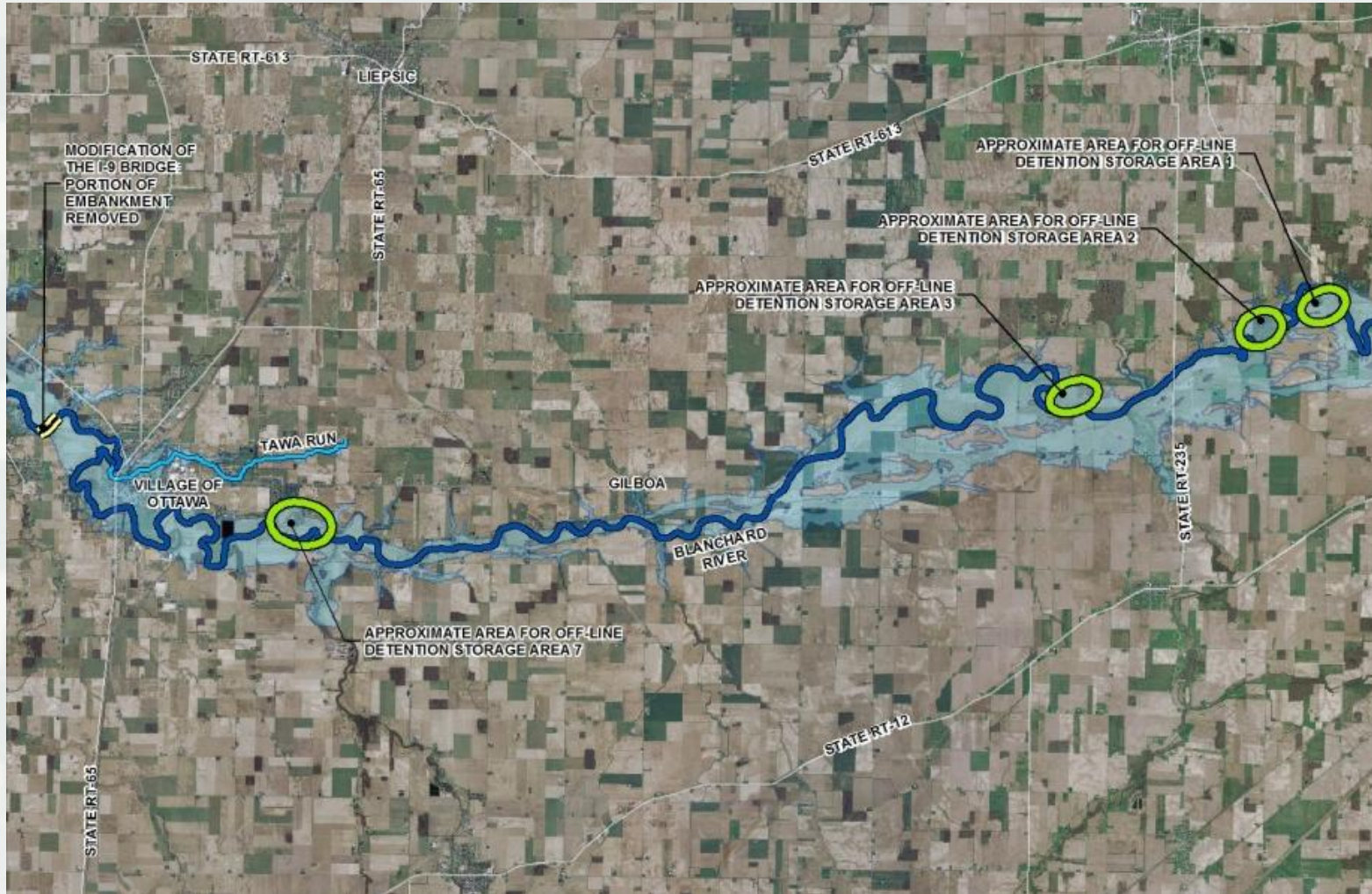
- 5, 10, 25-year floodplains
- Design Level of Protection: 100-year modeled flood level + 1' freeboard
- Considered building elevation, floodproofing, ringwalls, rebuilding, and acquisition

Selection Process

- Identify feasible treatments for each structure and assign costs
- Select least-cost feasible treatment



I-9 Bridge Modification and Offline Storage



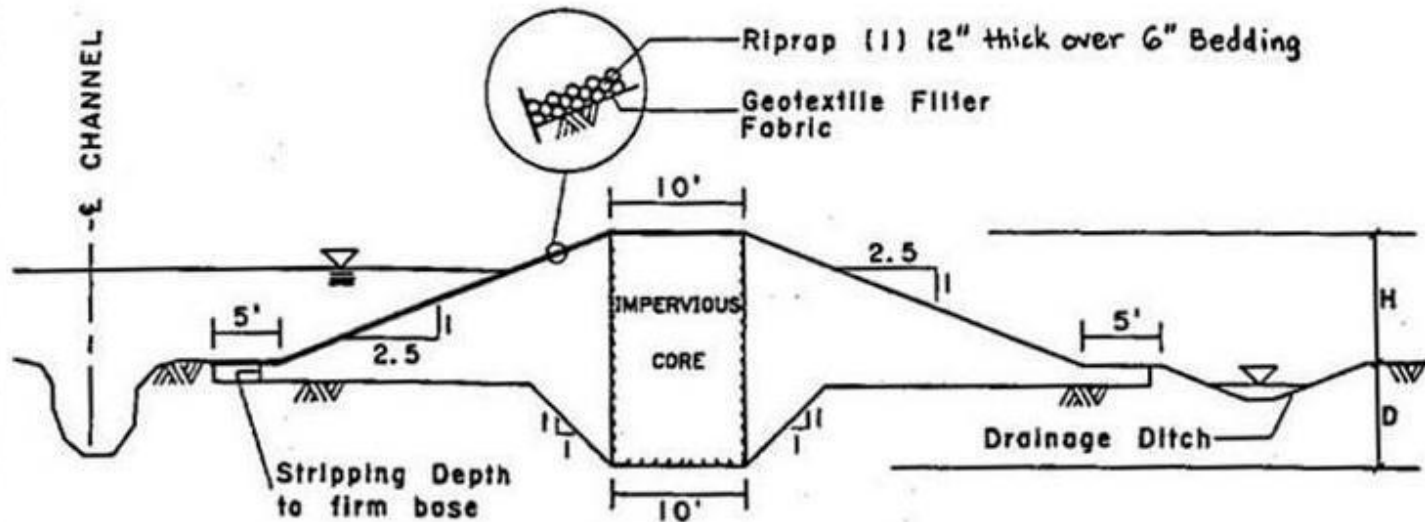
I-9 Bridge Modification and Offline Storage

- Includes I-9 Bridge Modification
- Addition of Offline Storage Areas to Store and Slow Water, Reduce Flood Elevations In Ottawa
- Cost \$13-18M



Off-line Storage Typical Design Features

TYPICAL LEVEE SECTION



NOTES:

(1) Riprap beneath bridges, adjacent to structures, and where required

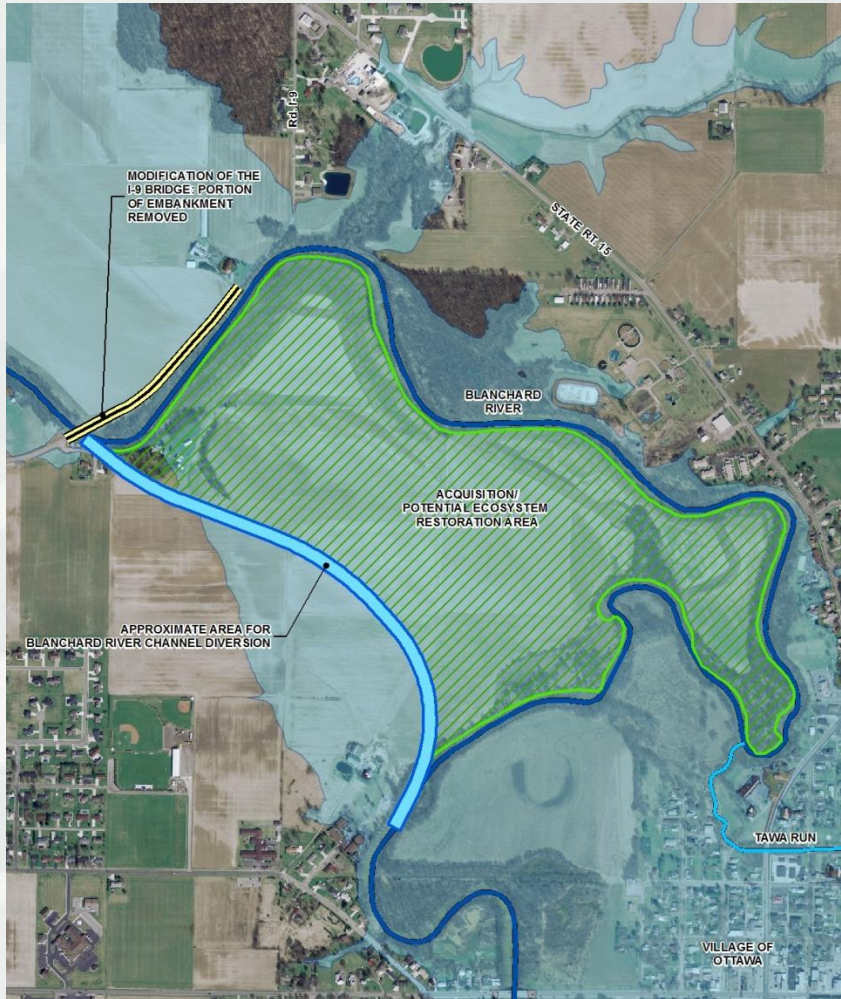
$$\begin{aligned} H < 3' & ; D = 3 \\ H \geq 3' & ; D = H \end{aligned}$$

$$\begin{aligned} D(\text{max}) & = 7.5' \text{ for } K \leq 10^{-5} \\ D(\text{max}) & = 15' \text{ for } K > 10^{-5} \end{aligned}$$



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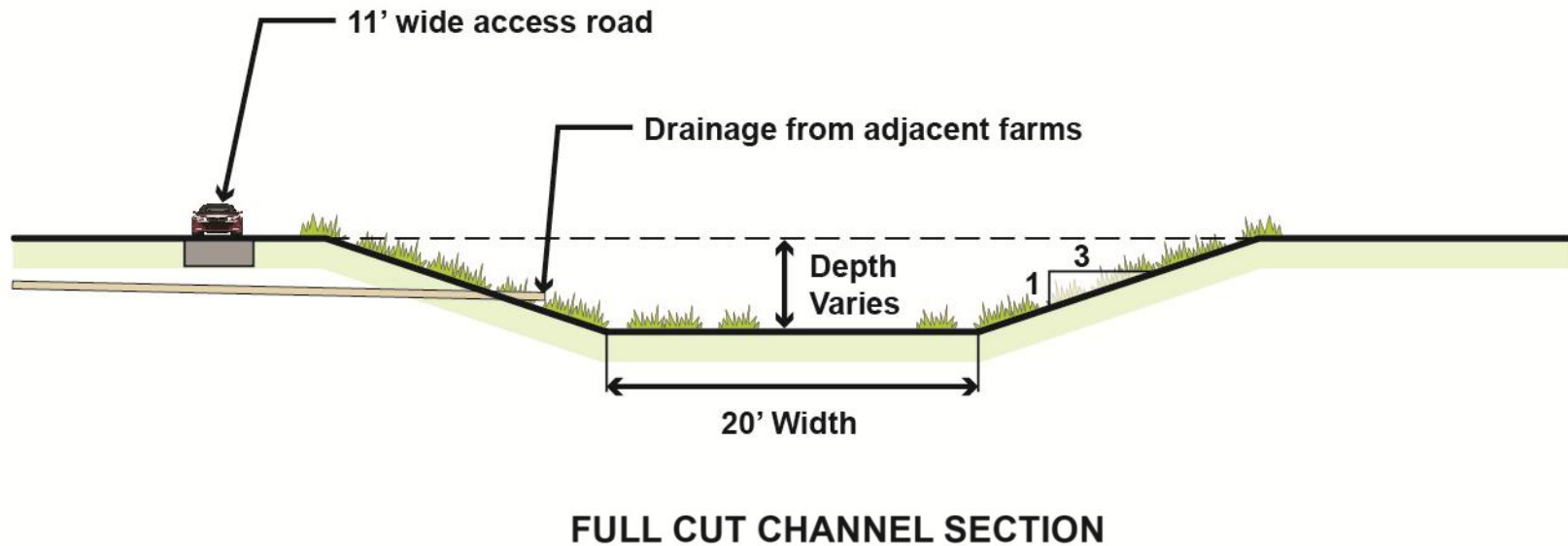
I-9 Bridge Modification and Channel Diversion



- Includes I-9 Bridge Modification
- Diversion Channel to Shorten Flow Path, Pull Floodwaters Away from Ottawa
- Restore Flow, Reduce Upstream Flood Elevations
- Cost \$7-10M
- Requires Acquisition of Farmland (180 acres) Cut-off by Diversion Channel.
- Land Used for Ecosystem Restoration/Mitigation and Source of Soil for Future Upland Reservoir Construction.



Diversion Channel Typical Cross-Section



Flood Water Surface Elevation Reduction

Plan	25 Year	100 Year
I-9	4-6"	9-11"
I-9 and Off-Line	4-8"	6-14"
I-9 and Diversion	10-12"	10-18"

- (1) Only I-9 and Off-Line includes Off-line Detention water storage benefits. Additional water surface elevation reduction may be possible once included in the Plan.
- (2) There is approximately 12" between the 2005 and 2011 floods and the 2005 to 2003 floods and 14" between the 1981 and 2011 floods

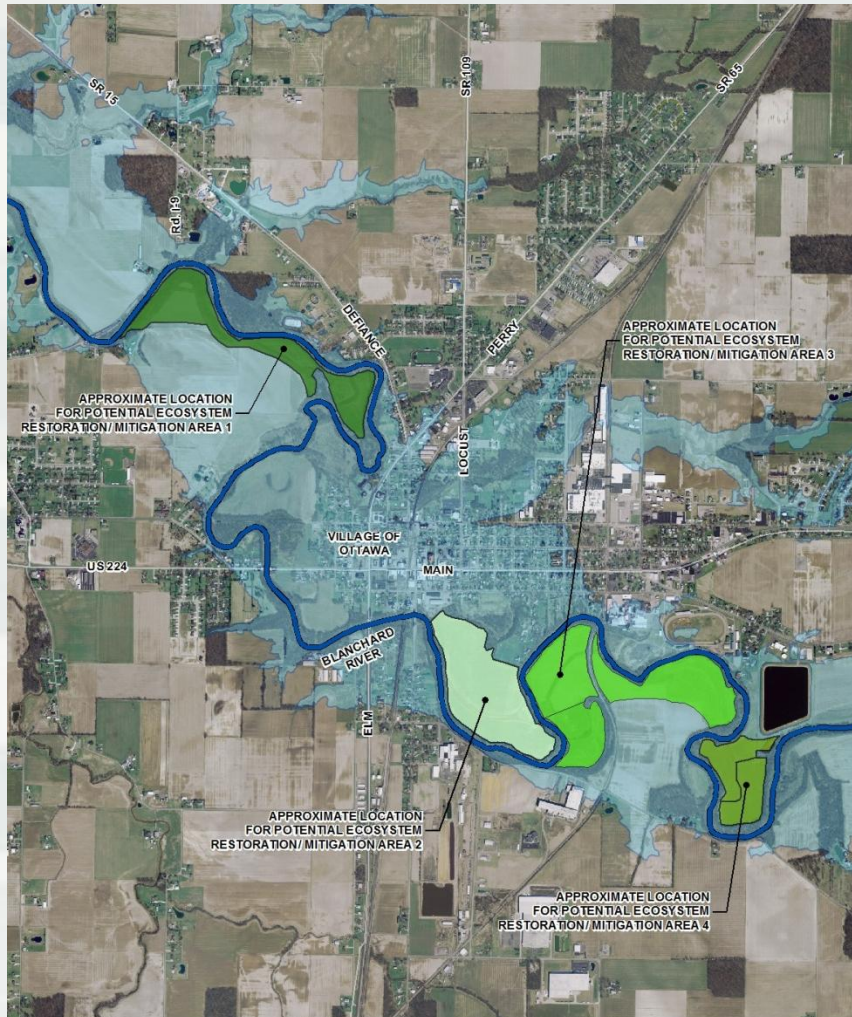


Findlay Alternative Plans



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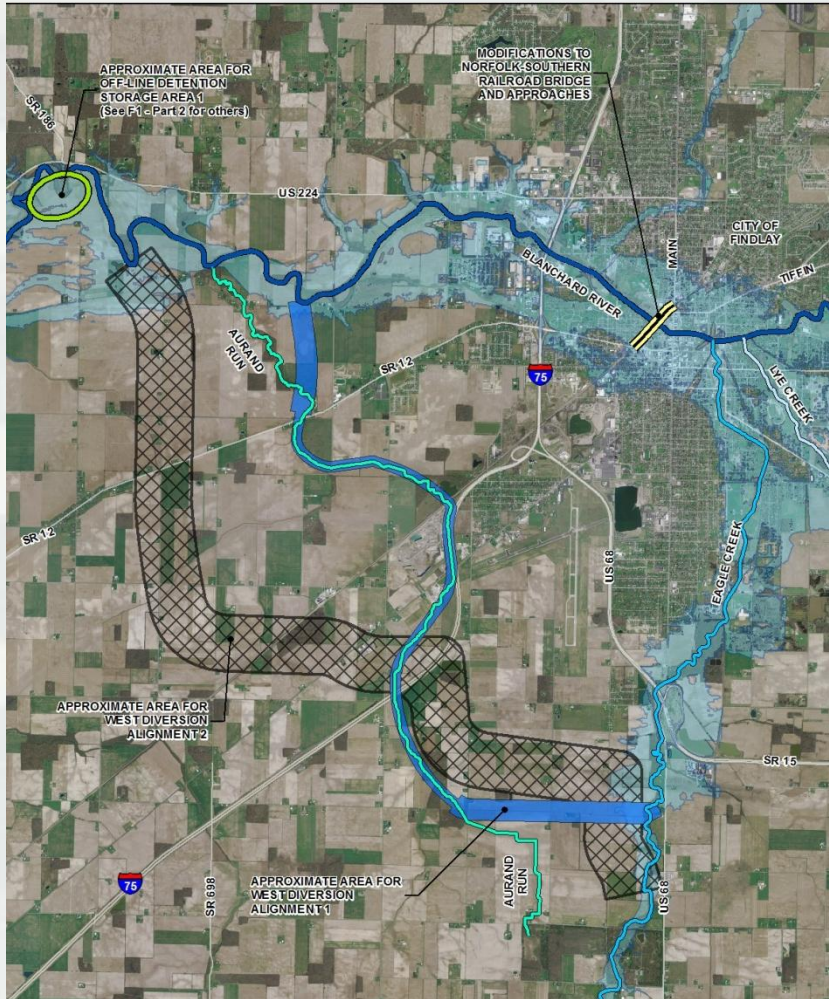
Additional Potential Ecosystem Restoration/Mitigation Areas



- Sites Along Blanchard River
- Focus on Riparian and Potential Wetland Restoration
- Mitigate Other Project Impacts in Findlay Area
- Help to Slow and Store Water
- Improve Water Quality by Trapping Sediment and Create Habitat Benefits
- Cost: To Be Determined



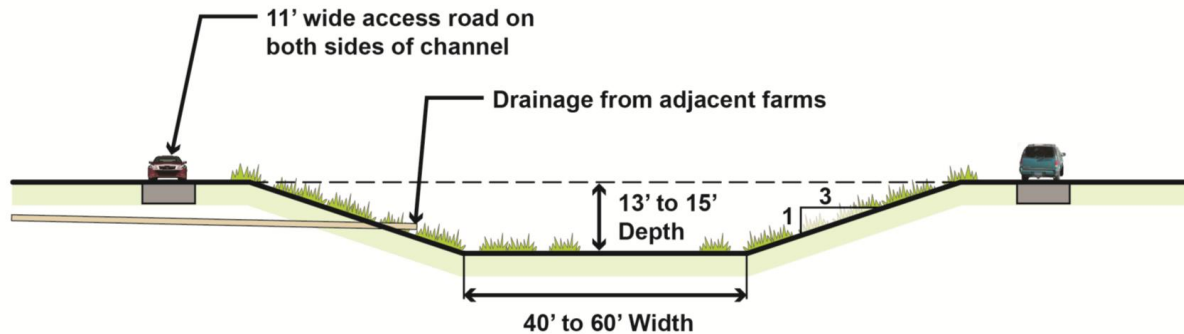
Western Diversion, Off-Line Detention, Norfolk Southern RR Bridge



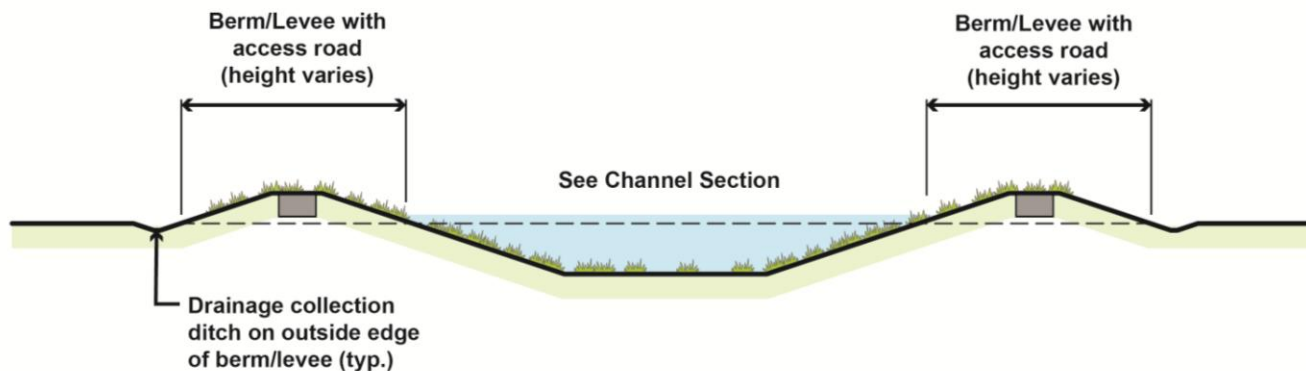
- Western Diversion
 - ▶ Align. 1 (Aurand Run)(7.7 miles)
 - ▶ Align. 2 (9.3 miles)
- Off-line Detention
 - ▶ 4 locations
 - ▶ Store and Slow Water, Mitigate for Induced Flooding.
- Norfolk and Southern RR Bridge
 - ▶ Add Span and Raise Grade
 - ▶ Remove Structures
- Cost \$50-70M
- Reduce Flood Water Surface Elevations, Reduced damages



Western Diversion Cross-Section



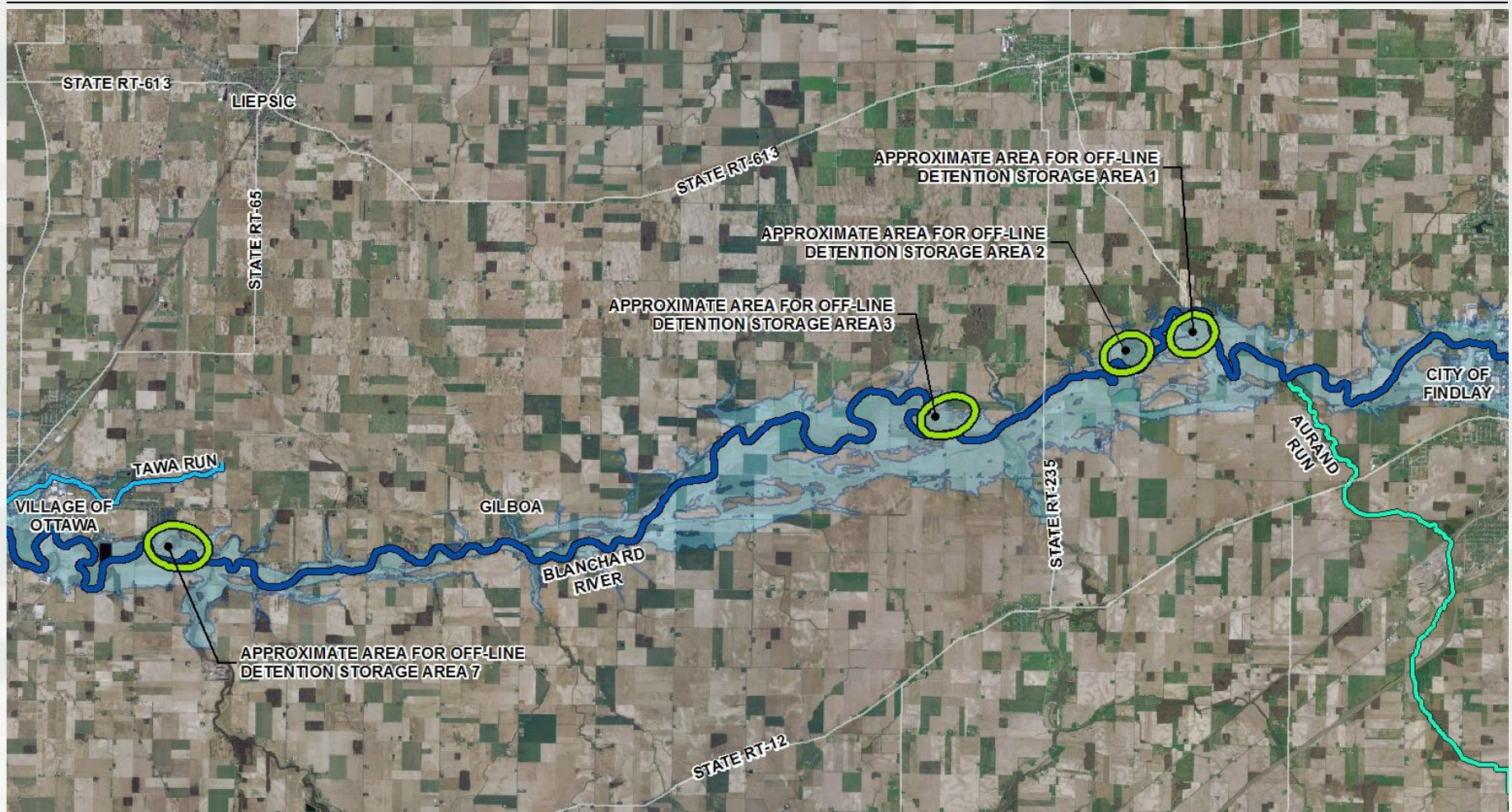
FULL CUT CHANNEL SECTION



CHANNEL WITH BERM/LEVEE CONTAINMENT



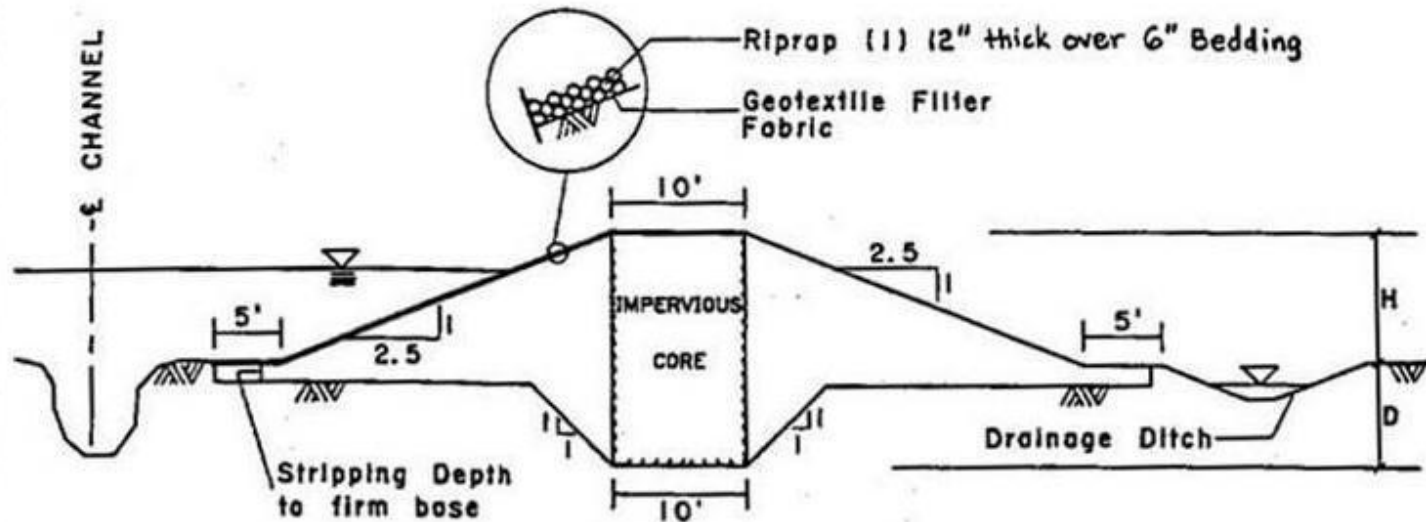
Western Diversion, Off-Line Detention, Norfolk Southern RR Bridge



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Off-line Storage Typical Design Features

TYPICAL LEVEE SECTION



NOTES:

(1) Riprap beneath bridges, adjacent to structures, and where required

$$H < 3' ; D = 3$$

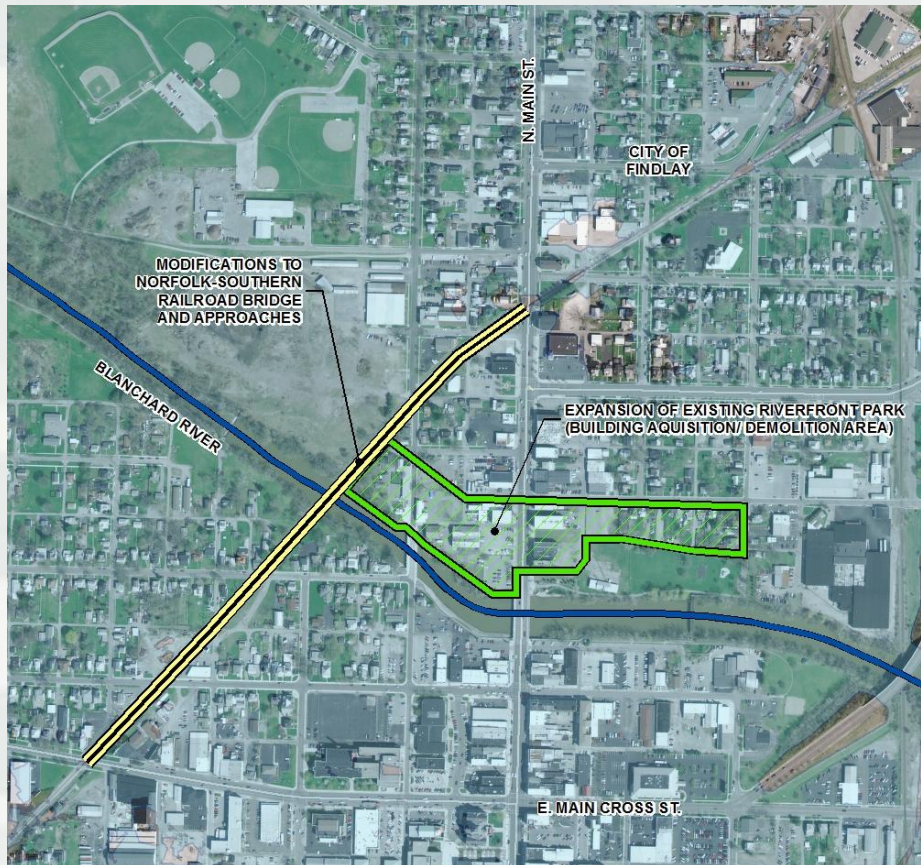
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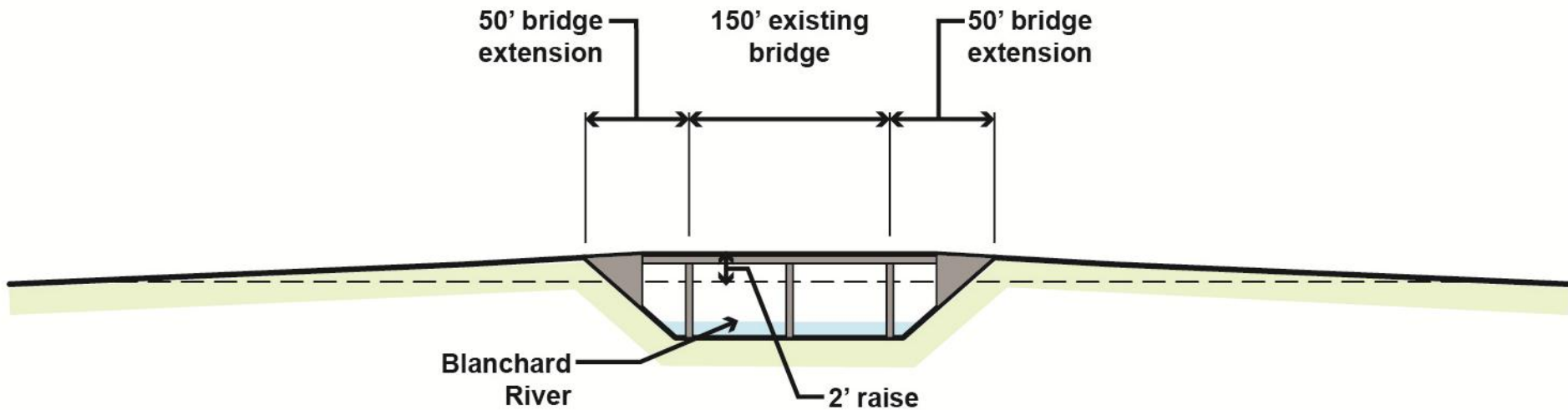
Western Diversion, Off-Line Detention, Norfolk Southern RR Bridge



- Add Additional Span For Water to Flow Through
- Raise Grade by 1.5-2 Feet to Improve Flow
- Remove Structures to Improve Water Flow Path Through Area
- Use Area for Recreation, Expand Bike Path

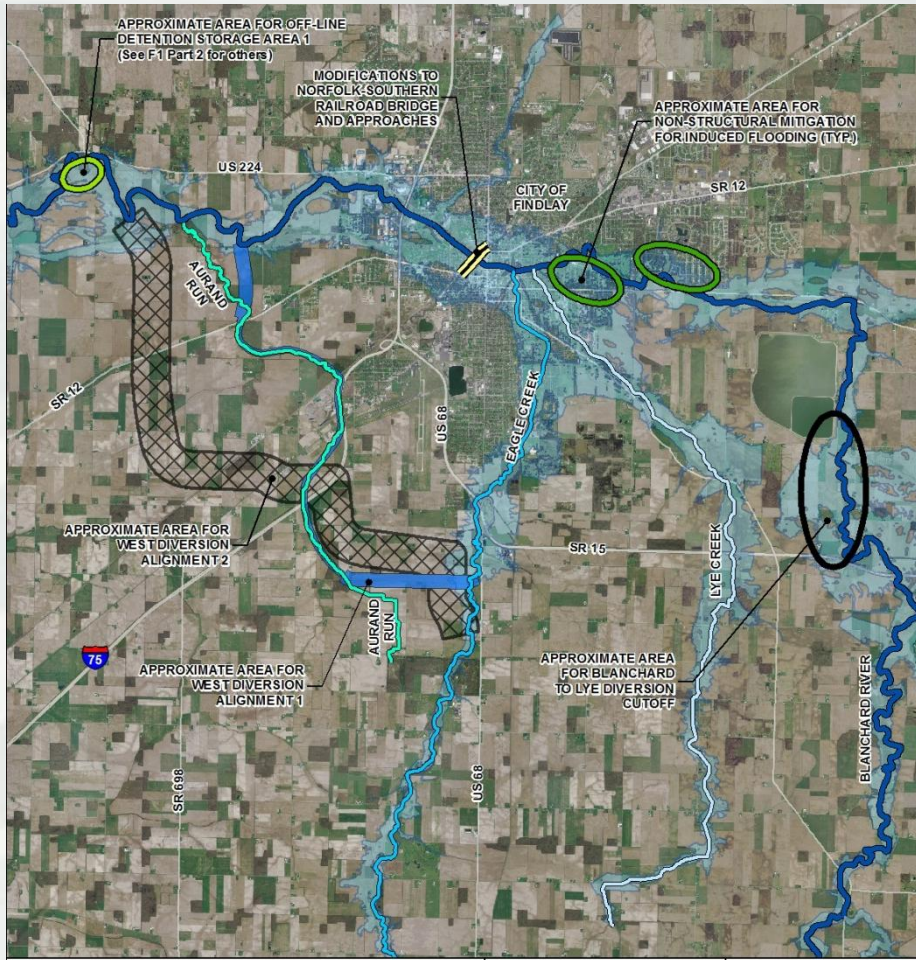


Norfolk Southern RR Bridge Profile Change to Improve Water Flows Through Downtown Findlay



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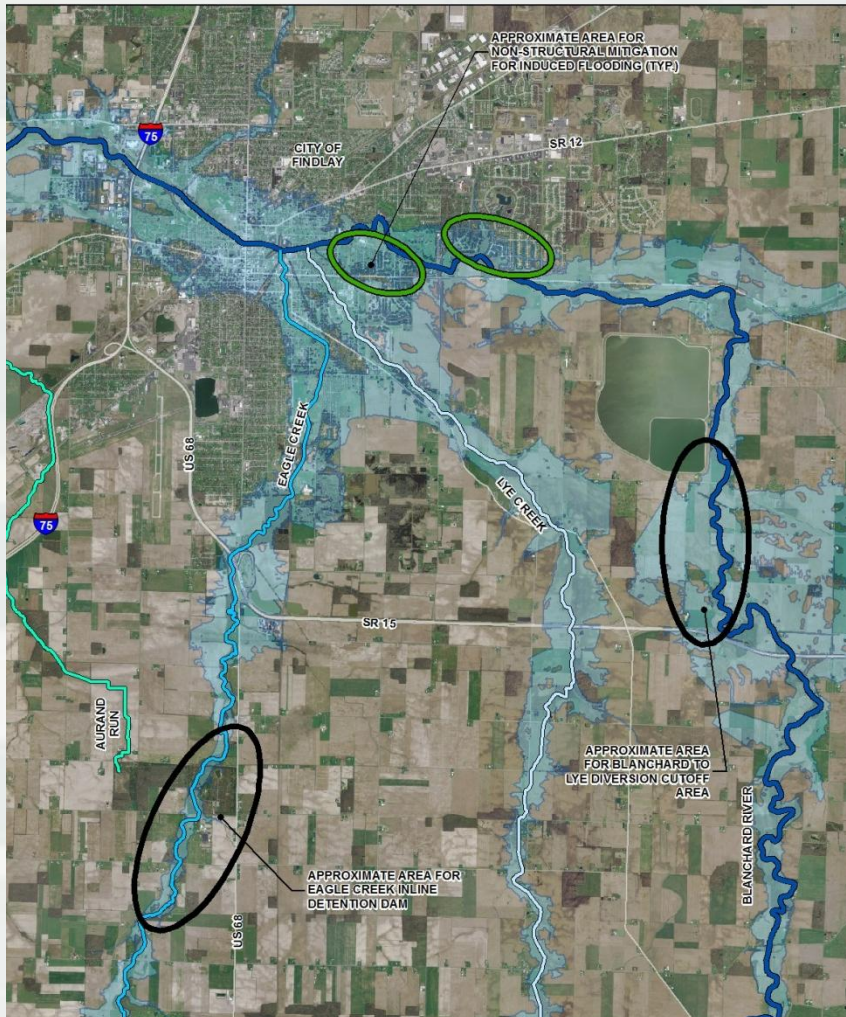
Western Diversion, Blanchard to Lye Cutoff, and NS Bridge



- Western Diversion (Align. 1 or 2)
- Blanchard/Lye Cutoff
- Non-structural Mitigation for Induced Flooding in Findlay
- Reduced Damage Along Eagle Creek, Keep Flows from Jumping to Lye Creek, Lye Creek Reduced Damages
- Cost: \$110M - \$140M



Eagle Creek In-Line Detention, Blanchard to Lye Cutoff, and Non-Structural Mitigation



- Detention Structure on Eagle Creek
- Blanchard to Lye Cutoff
- Non-Structural Mitigation for Induced Flooding
- Cost \$40-60M
- Benefits Include Reduced Flood Water Surface Elevations on Eagle Creek, Reduced Water Surface Levels in Findlay



Non-Structural Plan

- Retrofit, Buyouts and Removal, Flood Proofing, Ringwalls, Etc.
- Can be Combined with Structural Measures
- Evaluated for 5, 10, and 25 Year Storm
- Cost \$30M to \$70M
- Reduce Damage for Difference Frequency Storms
- Create Open Space Downtown in Area of Buyouts, Recreation and Restoration Benefits



Typical Non-Structural Measures Considered



Building elevation in progress



Building elevation complete



Ringwall protection



Building acquisition and removal from floodplain



Typical Non-Structural Measures Considered

Three nonstructural scales:

- 5, 10, 25-year floodplains
- Design Level of Protection: 100-year modeled flood level + 1' freeboard
- Considered building elevation, floodproofing, ringwalls, rebuilding, and acquisition

Selection Process

- Identify feasible treatments for each structure and assign costs
- Select least-cost feasible treatment



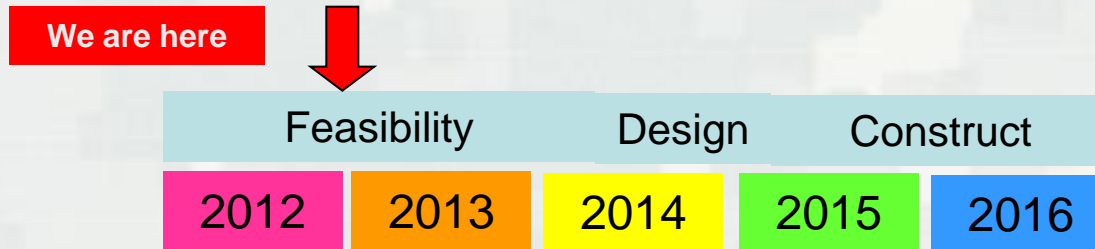
Flood Water Surface Elevation Reduction

Location	25 Yr. Diversion	100 Yr. Diversion	25 Yr. Blanchard /Lye	100 Yr. Blanchard /Lye
Bright Road/Blanchard	11-15"	11-15"	4-6"	4-6" increase
6 th Street/Eagle Creek	30-38"	18-26"	33-38"	18-24"
CR140/Blanchard	12-15"	14-23"	12-18"	10-12"
Main Street/Blanchard	12-18"	12-18"	18-22"	18-20"

There is a ~2' difference between the 2007 and 2011 floods at Main St.
There is a ~1.7' difference between the 2011 and 2006 floods at Main St.



Schedule and Budget



- **Feasibility – FY12 – FY15**
 - Final Array Synopsis
 - Detailed Project Report
 - National Environmental Policy Act Coordination
- **Design – FY15 - FY17**
 - *(65% Federal, 35% non-Federal)*
 - *Plans and Specifications*
- **Construction – FY17 – FY?**
 - (65% Federal, 35% non-Federal)
 - To be determined

